

CLAIMS

1. (Currently Amended) ~~Peptide vector~~ A composition
for transfecting a chemical substance selected from the
5 group consisting of nucleic acid sequences, proteins,
peptides and pharmacologically active chemical
substances, characterized in that it ~~contains~~ consists
essentially, in addition to the said chemical
substance, of at least one transfecting peptide derived
10 from the whole or part of a fibre of an adenovirus
selected from the group consisting of Ad2, Ad3, Ad4,
Ad7, Ad8, Ad9, Ad11, Ad12, Ad15, Ad16, Ad21, Ad40,
Ad41, FAV1 (CELO) and FAV7, which transfecting peptide
comprises at least:
- 15 - a segment of an NLS sequence derived from an
adenovirus fibre comprising between 4 and 5 amino acids
and including a sequence selected from the group
consisting of the following sequences: X₀-Lys-Arg-Val-
Arg (X₀KRVR) (SEQ ID NO:1), X₀-Lys-Arg-Ala-Arg (X₀KRAR)
20 (SEQ ID NO:2), X₀-Lys-Arg-Ser-Arg (X₀KRSR) (SEQ ID
NO:3), X₀-Lys-Arg-Leu-Arg (X₀KRLR) (SEQ ID NO:4), X₀-
Lys-Arg-Thr-Arg (X₀KRTR) (SEQ ID NO:5), X₀-Pro-Lys-Lys-
Pro-Arg (X₀PKKPR) (SEQ ID NO:6), in which X₀ is zero or
represents Thr (T), Ala (A), Ser-Lys (SK) or Ser (S),
25 or a segment of the SV40 virus Vp3 protein ~~and in~~
~~particular~~ consisting of the sequence GPNKKKRKL (SEQ ID
NO:24),
- a hydrophobic sequence comprising between 7
and 50 amino acids, derived from an adenovirus fibre
30 and selected from the group consisting of at least one
of the following sequences X₁-Phe-Asn-Pro-Val-Tyr-Pro-
Tyr-X₂ (X₁FNPVYPYX₂) (SEQ ID NO:7), X₁-Phe-Asp-Pro-Val-
Tyr-Pro-Tyr-X₂ (X₁FDPVYPYX₂) (SEQ ID NO:8), in which:
X₁ is zero or represents a sequence of at most
35 43 amino acids ~~, preferably a sequence of 5 to 15 amino~~
~~acids~~, comprising hydrophobic and/or polar and/or

acidic charged amino acids γ and ~~in particular~~ selected
from the group consisting of one of the following
sequences: Leu-Ser-Asp-Ser (LSDS) (SEQ ID NO:9), Leu-
Ser-Thr-Ser (LSTS) (SEQ ID NO:10), Leu-Ser-Ser-Ser
5 (LSSS) (SEQ ID NO:11), Pro-Ser-Glu-Asp-Thr (PSED) (SEQ
ID NO:12), Val-Asp-Asp-Gly (VDDG) (SEQ ID NO:13), Thr-
Gln-Tyr-Ala-Glu-Glu-Thr-Glu-Glu-Asn-Asp-Asp
(TQYAEETEENDD) (SEQ ID NO:14) or X_3 -Glu-Asp-Asp (X_3 EDD)
(SEQ ID NO:15) in which X_3 represents Ala (A), Val (V),
10 Leu (L), Phe (F) or Ile (I) and

X_2 is zero or represents a sequence of at most
43 amino acids ~~γ , preferably a sequence of 5 to 15 amino~~
~~acids~~, comprising hydrophobic and/or polar and/or
charged amino acids γ and ~~in particular one~~ selected
15 from the group consisting of the following sequences:
Glu-Asp-Glu-Ser (EDES) (SEQ ID NO:16), Asp-Thr-Glu-Thr
(DTET) (SEQ ID NO:17), Asp-Ala-Asp-Asn (DADN) (SEQ ID
NO:18), Asp-Pro-Phe-Asp (DPFD) (SEQ ID NO:19), Gly-Tyr-
Ala-Arg (GYAR) (SEQ ID NO:20), Glu-His-Tyr-Asn (EHYN)
20 (SEQ ID NO:21), Asp-Thr-Ser-Ser (DTSS) (SEQ ID NO:22)
or Asp-Thr-Phe-Ser (DTFS) (SEQ ID NO:23) and

- a polymeric sequence of basic amino acids or
a cationic polymeric sequence or a polyalcohol ~~γ , for~~
~~use as a medicament.~~

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2. (Currently amended) ~~Peptide vector~~ A composition
for transfecting a chemical substance selected from the
group consisting of nucleic acid sequences, proteins,
peptides and pharmacologically active chemical
30 substances, characterized in that it ~~contains~~ consists
essentially, in addition to the said chemical
substance, of at least one transfecting peptide derived
from the whole or part of a fibre of an adenovirus
selected from the group consisting of Ad2, Ad3, Ad4,
35 Ad7, Ad8, Ad9, Ad11, Ad12, Ad15, Ad16, Ad21, Ad40,

Ad41, FAV1 (CELO) and FAV7, which transfecting peptide comprises at least:

- a segment of an NLS sequence derived from an adenovirus fibre comprising between 4 and 5 amino acids and including a sequence selected from the group consisting of the following sequences: X₀-Lys-Arg-Val-Arg (X₀KRVR) (SEQ ID NO:1), X₀-Lys-Arg-Ala-Arg (X₀KRAR) (SEQ ID NO:2), X₀-Lys-Arg-Ser-Arg (X₀KRSR) (SEQ ID NO:3), X₀-Lys-Arg-Leu-Arg (X₀KRLR) (SEQ ID NO:4), X₀-Lys-Arg-Thr-Arg (X₀KRTR) (SEQ ID NO:5), X₀-Pro-Lys-Lys-Pro-Arg (X₀PKKPR) (SEQ ID NO:6), in which X₀ is zero or represents Thr (T), Ala (A), Ser-Lys (SK) or Ser (S), or a segment of the SV40 virus Vp3 protein [and in particular the sequence GPNKKKRKL (SEQ ID NO:24)],
- a hydrophobic sequence comprising between 7 and 50 amino acids, derived from an adenovirus fibre and selected from the group consisting of at least one of the following sequences X₁-Phe-Asn-Pro-Val-Tyr-Pro-Tyr-X₂ (X₁FNPVYPYX₂) (SEQ ID NO:7), X₁-Phe-Asp-Pro-Val-Tyr-Pro-Tyr-X₂ (X₁FDPVYPYX₂) (SEQ ID NO:8), in which:
 - X₁ is zero or represents a sequence of at most 43 amino acids, ~~preferably a sequence of 5 to 15 amino acids,~~ comprising hydrophobic and/or polar and/or acidic charged amino acids, ~~and in particular one and~~ selected from the group consisting of the following sequences: Leu-Ser-Asp-Ser (LSDS) (SEQ ID NO:9), Leu-Ser-Thr-Ser (LSTS) (SEQ ID NO:10), Leu-Ser-Ser-Ser (LSSS) (SEQ ID NO:11), Pro-Ser-Glu-Asp-Thr (PSED) (SEQ ID NO:12), Val-Asp-Asp-Gly (VDDG) (SEQ ID NO:13), Thr-Gln-Tyr-Ala-Glu-Glu-Thr-Glu-Glu-Asn-Asp-Asp (TQYAEETEEND) (SEQ ID NO:14) or X₃-Glu-Asp-Asp (X₃EDD) (SEQ ID NO:15) in which X₃ represents Ala (A), Val (V), Leu (L), Phe (F) or Ile (I) and
 - X₂ is zero or represents a sequence of at most 43 amino acids, preferably a sequence of 5 to 15 amino acids, comprising hydrophobic and/or polar and/or

charged amino acids ~~, and in particular one and~~
selected from the group consisting of the following
sequences: Glu-Asp-Glu-Ser (EDES) (SEQ ID NO:16), Asp -
Thr-Glu-Thr (DTET) (SEQ ID NO:17), Asp-Ala-Asp-Asn
5 (DADN) (SEQ ID NO:18), Asp-Pro-Phe-Asp (DPFD) (SEQ ID
NO:19), Gly-Tyr-Ala-Arg (GYAR) (SEQ ID NO:20), Glu-His-
Tyr-Asn (EHYN) (SEQ ID NO:21), Asp-Thr-Ser-Ser (DTSS)
(SEQ ID NO:22) or Asp-Thr-Phe-Ser (DTFS) (SEQ ID
NO:23), which transfecting peptide is combined with a
10 polymeric sequence of basic amino acids, a cationic
polymer or a polyalcohol ~~, for use as a medicament.~~

3. (Currently amended) ~~Transfection vector~~ The
composition according to Claim 1 or Claim 2, wherein
15 the polymeric sequence of the basic amino acids
comprises between 10 and 50 amino acid residues,
selected from the group consisting of lysine, arginine
and ornithine.

20 4. (Currently amended) ~~Transfection vector~~ The
composition according to claim 1 or 2, wherein the
cationic polymeric sequence is selected from the group
consisting of polymeric amines.

25 5. (Currently amended) ~~Transfection vector~~ The
composition according to claim 1 or 2, wherein the NLS
sequence is at the N-terminal end of the transfecting
peptide and the polymeric sequence of basic amino acids
is at the C-terminal end of the said transfecting
30 peptide.

6. (Currently amended) ~~Transfection vector~~ The
composition according to claims 1 or 2, wherein, when

the chemical substance is a nucleic acid, the
transfecting peptide/nucleic acid ratio is between
0.3:1 and 15:1, ~~preferably between 2:1 and 6:1.~~

5 7. (Currently amended) ~~Transfection vector~~ The
composition according to claims 1 or 2, combined with a
targeting ligand.

8. (Currently amended) A composition consisting
10 essentially, in addition to the said chemical substance
and to at least one of a transfection vector according
to claim 1 or 2, of and a suitable vehicle selected
from the group consisting of bile salts, antiproteases,
cyclodextrins and derivatives thereof, antiseptics and
15 polyols.

9. (Currently amended) A method of transfecting
eukaryotic cells *in vitro* with a chemical substance
selected from the group consisting of nucleic acid
20 sequences, proteins, peptides and pharmacologically
active chemical substances, characterized in that it
comprises the bringing into contact and the incubation
of a ~~transfection vector~~ composition according to claim
1 or 2 in a dilution buffer comprising 100 - 150 mM
25 NaCl with eukaryotic cells for 15 to 120 minutes at
room temperature, the chemical substance to be
transfected:transfecting peptide ratio being between
0.3:1 and 15:1 ~~, preferably between 2:1 and 6:1,~~
~~preferably between 4:1 and 6:1.~~

30 10. (Currently amended) ~~Peptide vector~~ A composition
for transfecting a chemical substance selected from the

group consisting of nucleic acid sequences, proteins, peptides and pharmacologically active chemical substances, containing, in addition to the said chemical substance, at least one transfecting peptide

5 which comprises:

- a segment of an NLS sequence consisting of sequence ID NO:2,
- a segment of a sequence consisting of sequence ID NO:10,
- 10 - a segment of a sequence consisting of sequence ID NO:16, and
- a polylysine.

11. (New) A composition according to Claim 1 or
15 Claim 2, wherein X_1 and/or X_2 represents a sequence of 5 to 15 amino acids.

12. (New) A composition according to Claim 6
wherein the transfecting peptide/nucleic acid ration is
20 between 2:1 and 6:1.

13. (New) A method according to Claim 9 wherein
the ratio of substance to be transfected:transfecting
peptide is between 2:1 and 6:1.

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14. (New) A method according to Claim 9 wherein
the ratio of substance to be transfected:transfecting
peptide is between 4:1 and 6:1.